



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/791,828      | 03/04/2004  | Leping Li            | 635.43617X00        | 3640             |

20457 7590 11/16/2006

ANTONELLI, TERRY, STOUT & KRAUS, LLP  
1300 NORTH SEVENTEENTH STREET  
SUITE 1800  
ARLINGTON, VA 22209-3873

EXAMINER

KOEHLER, CHRISTOPHER M

ART UNIT PAPER NUMBER

3726

DATE MAILED: 11/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |   |                                  |  |
|------------------------------|---|----------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/791,828      | <b>Applicant(s)</b><br>LI ET AL. |  |
|                              | <b>Examiner</b><br>Christopher M. Koehler | <b>Art Unit</b><br>3726          |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 29-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

1. Claim 37 is objected to because of the following informalities: "last" should be changed to --least--. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 29-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Gitis et al. (US Patent No. 6,494,765).

#### Claim 29:

Gitis teaches a method of polishing a semiconductor workpiece comprising, providing a substrate (74 figure 10) having a substantially flat surface (80), removing material from the surface (80) by moving the surface of the substrate relative to, on and along a polishing surface (96) establishing a polishing pressure between the surface of the substrate and the polishing surface, said moving including a rotation about an axis (x-x) by a shaft driven in a predetermined manner and axially loaded by a polishing force establishing the polishing pressure, providing along the shaft a shaft section (140 figure 13) having a predetermined torque/deformation characteristic, said characteristic independent of the torque/deformation characteristic of the shaft, monitoring the deformation of the shaft section as a torque indicative signal, via strain gauge, controlling the removing in dependency of the torque indicative signal and manufacturing the workpiece from the substrate having the material removed (abstract).

Art Unit: 3726

Claim 30:

Gitis teaches a method of polishing a semiconductor workpiece comprising, providing a substrate (74 figure 10) having a substantially flat surface (80), removing material from the surface (80) by moving the surface of the substrate relative to, on and along a polishing surface (96), said moving including a rotation about an axis (x-x) by a shaft driven in a predetermined manner, providing along the shaft a shaft section (140 figure 13) having a predetermined torque/deformation characteristic, said characteristic independent of the torque/deformation characteristic of the shaft, monitoring the deformation of the shaft section as a torque indicative signal, via strain gauge (col. 11, line 61-col. 12, line 38), outputting the torque indicative signal, transmitting a signal dependent from the torque indicative signal from the rotating section to a system part which is stationary with respect to the section, thereby performing analog-to-digital signal conversion of the transmitted signal before performing the rotating-to-stationary transmitting (col. 12, lines 4-38), controlling the removing in dependency of the torque indicative signal and manufacturing the workpiece from the substrate having the material removed (abstract).

Claim 31:

Gitis teaches that the shaft carries the substrate (figure 10).

Claim 32:

Gitis teaches that the substrate has at least one material interface between two different materials and substantially parallel to the substantially flat surface, thereby

Art Unit: 3726

monitoring when the removing reaches the interface by the monitoring of the deformation (col. 9, lines 14-32).

Claim 33:

Gitis teaches that the controlling comprises disabling the removing when the new material, or new coefficient of friction, is detected (col. 9, lines 14-32 and abstract).

Claim 34:

Gitis teaches that the monitoring of the deformation is performed by strain gauges in an arrangement mounted to the section (col. 11, line 61-col. 12, line 14).

Claim 35:

Gitis teaches providing at least part of the shaft with a first hollow inner space (center hole through plate member 142 in figure 13) and providing at least part of the section with a second hollow inner space (created by thin walled section 146 of figure 13 having a larger outer diameter and occupying the inner space between plates 142 and 144 sharing the axis of hole through 142 and 144), the inner spaces being in communication with one another, monitoring the deformation with a sensor arrangement (strain gauges, col. 11, line 61-col. 12, line 3) mounted on the section and generating an electric output signal and transmitting a signal dependent on the output signal to a system stationary with respect to the rotating section through the first and second hollow spaces being in communication (col. 11, line 61-col. 12, line 38).

Claim 36:

Gitis teaches providing at least part of the shaft with a first hollow inner space (center hole through plate member 142 in figure 13) and providing at least part of the

Art Unit: 3726

section with a second hollow inner space (created by thin walled section 146 of figure 13 having a larger outer diameter and occupying the inner space between plates 142 and 144 sharing the axis of hole through 142 and 144), the inner spaces being in communication with one another, monitoring the deformation by a sensor arrangement (strain gauges, col. 11, line 61-col. 12, line 3) mounted on the section and providing an electric supply to the sensor arrangement via the first and second hollow spaces in communication (col. 11, line 61-col. 12, line 38).

Claims 37 and 38:

Gitis teaches monitoring the deformation by means of a sensor arrangements mounted on the section and generating an electric output signal, transmitting a signal dependent from the electric out put signal from the rotating section to a system stationary with respect to the section via a slide contact arrangement (col. 12, lines 15-38).

Claim 39:

Gitis teaches that the shaft section has an outer diameter less than the outer diameter of the shaft.

Claim 40:

Gitis teaches that the workpiece is a semiconductor workpiece (abstract).

Claim 41:

Applicant defines that a low-scale or ultra-low-scale device microelectronic workpiece is a semiconductor workpiece on page 12, lines 21-25. Therefore the teaching of Gitis that the workpiece is a semiconductor is sufficient for this limitation.

Art Unit: 3726

Claim 42:

Gitis teaches performing the removal by chemical mechanical polishing thereby applying slurry to the polishing surface (col. 10, lines 28-48).

***Response to Arguments***

4. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

5. Applicant's arguments filed September 11, 2006 have been fully considered but they are not persuasive.

6. Applicant argues that the sensor arrangement disclosed in Gitis et al. is not that which is applied against the claims of the instant application. Gitis teaches a system of four sensors (84, 86, 108 and 110) and two different sensor types (figures 12 and 13) for detecting forces and torques. Gitis states (paragraph 76) that the sensor assemblies comprise a *plurality* of sensor elements which can be made in the form of a force sensor detecting a force (presumably figure 12) acting perpendicular to the working surface, a force sensor detecting a force in a direction parallel to the working surface (same as the previous) *and* a torque sensor detecting a torque (figure 13). One would interpret the disclosure of Gitis such that each of the sensor assemblies (84, 86, 108 and 110) includes at least a force sensor and a torque sensor and not singly one or the other.

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 3726

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Koehler whose telephone number is (571) 272-3560. The examiner can normally be reached on Mon.-Fri. 7:30A-4:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 3726

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CMK



DAVID P. BRYANT  
SUPERVISORY PATENT EXAMINER

11/8/06